

provided as Attachment 'A'. It therefore follows that upon entry of this amendment, Claims 38-42 and 44-52 will be pending in the instant application. Applicant asserts that the amendments and new claims presented herein do not introduce new matter. Applicant refers the Examiner to the pages 2-3 and 7-9 of the specification for support of the amendments.

Claim Rejection under 35 U.S.C. §112, first paragraph:

In the Final Office Action, Claims 39-42, 47 and 48 were rejected under 35 U.S.C. §112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

In describing the basis of this rejection, the Examiner essentially stated that, the organic silicon precursor is not in equilibrium with the gaseous oxides of hydrogen since both intermediate and product compounds of silicon are removed from the system by deposition. Thus for at least this reason, The Examiner concludes that Applicant's proposed theory is incorrect. Also, the Examiner provided two additional reasons why Applicant's proposed theory of the instant invention is most likely incorrect. As a result, the Examiner concludes that in the absence of evidence to the contrary, the method as claimed would not operate as alleged. Applicant disagrees.

Specifically, Applicant's amended claims recite, in pertinent part, that

at least one of H₂O and H₂O₂ is fed into the reactor ... under conditions which are effective to reduce formation of undesired reaction intermediates of the organic silicon precursor which form at higher topographical elevations on the substrate than would otherwise occur without the feeding of the at least one of H₂O and H₂O₂ into the reactor under otherwise identical depositing conditions.

Thus, Applicant respectfully contends that rather than the gas phase reaction envisioned by the Examiner. Rather, a more accurate reading of the specification suggests that the inadequate coating indicated in Fig. 2, is the result of premature forming of reaction intermediates at high topographical elevations (page 3). Since such intermediates having a higher sticking coefficient than the desired silicon dioxide product, formation at such high topographical elevations leads to excess deposition and a non-conformal coating as shown. The specification suggests that excess gaseous oxides of hydrogen can advantageously inhibit or reduce the formation of such deposits (*ibid.*). The most likely mechanism for such an advantageous result is the reverse of the reaction that resulted in the deposition of the intermediate. As such would not constitute the gas phase reaction the Examiner has concluded is incorrect, Applicant respectfully requests reconsideration in view of these remarks and of Applicant's amended claims. Allowance of such claims is earnestly sought.

Claim Rejection under 35 U.S.C. §112, second paragraph:

Claims 39-42, 47 and 48 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Specifically, the Examiner states that the language "reducing the decomposition rate" is indefinite. While Applicant does not agree, Claims 8, 47 and 48 are amended. The specific phrase is removed and alternate language supplied. Applicant believes that the rejection is thus moot.

Claim Rejections Under 35 U.S.C. §102(e)

In the Final Office Action, Claims 39-40, 42, 43-44 and 47 were rejected under 35 U.S.C. §102(e) as being anticipated by Sukharev (US 5,710,079). Claim 43 is canceled herein, thus the rejection of such claim is moot. Applicant remarks with respect to Claims 39-40, 42 and 47, as well as Claim 44, which is amended to depend from Claim 39.

Applicant's independent Claims 39 and 47 each recite, in pertinent part and as presented above, providing an oxide of hydrogen under conditions which are effective to reduce formation of undesired reaction intermediates of the organic silicon precursor which form at higher topographical elevations on the substrate. The cited art Sukharev, on the other hand, does not teach or even suggest reducing the formation of such undesired intermediates. Rather, Sukharev states that "[t]he present invention is directed to a method ... for increasing the deposition rate of materials" (col. 3, lines 12-13), where the exemplary material deposited is silicon dioxide and TEOS is the exemplary organometallic precursor to the silicon dioxide (*ibid*, lines 21-25). Thus while the instant application and the cited art share some common elements, Applicant respectfully asserts that the cited art does not teach, or even suggest, any method for inhibiting

or reducing the formation of anything, yet alone the undesirable intermediates recited in Applicant's claims.

To this effect, Applicant directs the Examiner to Sukharev at column 3, lines 26-49 where the manner in which an enhanced deposition rate is obtained. Thus Sukharev states that in accordance with the invention, ozone is provided together with the organometallic precursor to the reaction chamber and simultaneously exposed to UV radiation. Sukharev instructs that the radiation decomposes the ozone to provide molecular oxygen and atomic oxygen. The latter, is well known to be extremely reactive. As stated by Sukharev the atomic oxygen reacts to provide hydroxyl radicals which in turn serve to accelerate the decomposition of the organometallic precursor. In an alternate method, hydrogen peroxide is provided in place of ozone, but again an exposure to UV radiation is employed to produce the atomic oxygen needed to create the hydroxyl radicals that result in the accelerated decomposition of the precursor. In contrast, Applicant never teaches the use of such radiation to form molecular or atomic oxygen and in the hot wall CVD systems described, Applicant teaches that only thermal energy is employed.

The Examiner also remarks to the relevancy of *In re Swinhart* and *In re Fitzgerald*. However, Applicant respectfully contends that such case law is not germane to the instant application as the shift in the burden suggested by such decisions can only be made where the Examiner presents a reasonable argument regarding inherency. Here, Applicant asserts that the Examiner's conclusion is reached incorrectly interpreting a

proposed theory of operation and the teachings of the cited art as a whole, which include a mechanism limited to thermal activation only, thus precluding the cited art's teaching of photolytically forming atomic oxygen. Thus Applicant asserts that Claims 39 and 47 are not anticipated by the cited art and are in condition for allowance as presented herein. In addition, as Claims 40, 42 and 44 depend from Claim 39, such claims are also represented as being in condition for allowance for the same reasons as the claim from which they depend.

Claim Rejections Under 35 U.S.C. §103(a)

Sukharev

In the Final Office Action, Claim 41 was rejected under 35 U.S.C. §103(a) as being unpatentable over Sukharev (US 5,710,079).

The Examiner, in the Final Office Action, alleged that Sukharev discloses all of the limitations of Applicant's Claim 41 except for the recited concentration range. Referring to the discussion of Sukharev above, Applicant asserts that the limitation of "conditions which are effective to reduce formation of undesired reaction intermediates of the organic silicon precursor which form at higher topographical elevations on the substrate" cannot be an inherent characteristic of the chemistry employed by Sukharev, which is directed to achieving an enhanced deposition rate for silicon dioxide. Therefore, Applicant respectfully asserts that as Sukharev teaches a process that is essentially the opposite of what is claimed, it cannot be held forth to teach or even suggest, at least, the specific limitation recited above. Thus Sukharev does not disclose all of the

limitations of Claim 41 and it follows then that, Claim 41 is in condition for allowance as presented herein.

Sukharev in view of Wolf

In the Final Office Action, Claims 45-46 and 48 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sukharev in view of Wolf (*Silicon Processing for the VLSI Era*, Vol. 1).

Specifically, the Examiner stated that Sukharev discloses all of the limitations of Applicant's Claims 45-46 and 48 except for the different specific types of CVD reactors recited in each of the rejected claims and that Wolf teaches each of these CVD reactors. Referring again to the discussion of Sukharev above, Applicant asserts that the limitation of "conditions which are effective to reduce formation of undesired reaction intermediates of the organic silicon precursor which form at higher topographical elevations on the substrate" cannot be an inherent characteristic of the chemistry employed by Sukharev, which is directed to achieving an enhanced deposition rate for silicon dioxide. Therefore, Applicant respectfully asserts that as Sukharev teaches a process that is essentially the opposite of what is claimed, it cannot be held forth to teach or even suggest, at least, the specific limitation recited above. Thus Sukharev does not disclose all of the limitations of Claims 45-46 and 48, and it follows then that, such claims are in condition for allowance as presented herein.

New Claims 49-52 are similar to some or all of Claims 40-42, except for the dependency indicated in each claim. Therefore, Applicant asserts that such new claims are also in condition for allowance.

Applicant has shown that each claims presented herein are in condition for allowance as none of the art cited in the above-referenced Final Office Action, or any other art of record in the instant application, discloses, teaches or even suggests all the limitations recited in any or all of the pending claims. Action to this effect is requested. If the Examiner's next action is to be anything other than a Notice of Allowance, or if the Examiner plans to issue a Notice of Allowance but believes that there are other or additional reasons for such allowance of the pending claims, the undersigned respectfully requests a telephonic interview.

Respectfully submitted,

Dated: Jan 30, 2001

By: 

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Enclosure: Attachment 'A'